

## WHAT IS CLAIMED

1. A scroll fluid machine comprising:

multi-stage compression section in which the fluid compressed in the preceding stage compression section is further compressed in the succeeding stage compression section;

a lap groove formed spiraling from the vicinity of the discharge port of the compressed fluid of the final stage compression space to the fluid take-in side of the initial stage compression space, in the tip of the lap being formed a tip seal groove to receive a seal element, and a rand being formed between the discharge port at the compression end part of said preceding stage compression section and the suction port of the succeeding stage compression section;

an intermediate seal element received in the intermediate groove formed on the surface of said rand which faces the end plate of the mating scroll for preventing the leakage of the compressed fluid from said succeeding stage compression section to said discharge port opening side of said preceding stage compression section, said seal element including

a tip seal received in the groove formed in the tip of the spiral lap of both side forming said lap groove, and

an intermediate seal element located between said discharge port opening and said suction port opening;

wherein said intermediate seal element is a circular seal element partitioning said succeeding stage compression section circularly.

2. A scroll fluid machine comprising:

multi-stage compression section in which the fluid compressed in the preceding stage compression section is further compressed in the succeeding stage compression section;

a lap groove formed spiraling from the vicinity of the discharge port of the compressed fluid of the final stage compression space to the fluid take-in side of the initial stage compression space, in the tip of the lap being formed a tip seal groove to receive a seal element, and a rand being formed between the discharge port at the compression end part of said preceding stage compression section and the suction port of the succeeding stage compression section;

an intermediate seal element received in the intermediate groove formed on the surface of said rand which faces the end plate of the mating scroll for preventing the leakage of the compressed fluid from said succeeding stage compression section to said discharge port opening side of said preceding stage compression section, said seal element including,

a first seal element which extends spirally from the fluid take-in side of said preceding stage compression section side to the final discharge port side of said succeeding stage compression section and partitions said discharge port opening and said suction port opening at said rand surface in the course of its extension, and

a second seal element, an end of which contacts the side face of said first seal element at the side opposite to said discharge port opening in the vicinity of said discharge port opening and which extends from the vicinity of said discharge port opening to the vicinity of said discharge port opening, surrounding said succeeding stage compression section to contact the side face of said first seal element at the side opposite to said suction port opening.

3. A scroll fluid machine comprising:

multi-stage compression section in which the fluid compressed in the preceding stage compression section is further compressed in the succeeding stage compression section;

a lap groove formed spiraling from the vicinity of the discharge port of the compressed fluid of the final stage compression space to the fluid take-in

side of the initial stage compression space, in the tip of the lap being formed a tip seal groove to receive a seal element, and a rand being formed between the discharge port at the compression end part of said preceding stage compression section and the suction port of the succeeding stage compression section;

an intermediate seal element received in the intermediate groove formed on the surface of said rand which faces the end plate of the mating scroll for preventing the leakage of the compressed fluid from said succeeding stage compression section to said discharge port opening side of said preceding stage compression section;

wherein a tip seal groove is formed extending spirally from the fluid take-in side of said initial stage compression section toward the compressed fluid discharge port side of said final stage compression space;

wherein an intermediate groove is formed communicating with said tip seal groove in said rand between said discharge port opening and said suction port opening;

a set of seal elements including a plurality of seal elements is received in said intermediate groove and said tip seal groove,

said seal set including;

a first tip seal which extends from the compressed fluid discharge port side of said final stage compression space toward said initial stage compression space via said intermediate groove,

a second tip seal which extends parallel with said first tip seal from the compressed fluid discharge port side of said final stage compression space to the vicinity of said suction port opening where the second tip seal depart from said first tip seal and contacts said first seal in the vicinity of said discharge port opening, and

a third tip seal which extends in said tip groove parallel with said second tip seal from the vicinity of said suction port opening to partition said succeeding stage compression section circularly and further extends parallel with said first tip seal toward said initial stage compression section side.

4. A scroll fluid machine comprising:

multi-stage compression section in which the fluid compressed in the preceding stage compression section is further compressed in the succeeding stage compression section;

a lap groove formed spiraling from the vicinity of the discharge port of the compressed fluid of the final stage compression space to the fluid take-in side of the initial stage compression space, in the tip of the lap being formed a tip seal groove to receive a seal element, and a rand being formed between the discharge port at the compression end part of said preceding stage compression section and the suction port of the succeeding stage compression section;

an intermediate seal element received in the intermediate groove formed on the surface of said rand which faces the end plate of the mating scroll for preventing the leakage of the compressed fluid from said succeeding stage compression section to said discharge port opening side of said preceding stage compression section;

wherein a tip seal groove is formed extending spirally from the fluid take-in side of said initial stage compression section toward the compressed fluid discharge port side of said final stage compression space,

wherein an intermediate groove is formed communicating with said tip seal groove in said rand between said discharge port opening and said suction port opening, and

wherein said seal element is a single tip seal received in said tip seal groove and said intermediate groove.